QL9600 Universal Programmer User Manual

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Chapter 1
Introduction

1.1 Product Overview

The System General QL9600 is a high-speed universal device programming module. The module is designed for production as well as engineering applications through a multi-link connectivity. You can start with a single module for engineering application and when you are ready for mass production, the single module unit can be expanded into a powerful production system by adding more modules.

NOTE: The System General QL9600 is same as the System General T9600, except that the QL9600 supports QuickLogic devices only and the T9600 is a universal programmer. To modify the T9600 for use with QuickLogic devices, obtain the Extended Pin Driver (EPD) module and the adapters needed to program QuickLogic devices.

The QL9600 programmer(s) must be connected to a computer for remote control operation. The devices supported on the system include Eclipse II, Eclipse Plus, Eclipse, and certain products from the QuickPCI family.

QL9600 is designed for flexibility. Since each programming socket site is controlled and supported by an independent programming system, the programming operation on each module can take place synchronously as well as asynchronously. The programming result of one module will not have any adverse effect on other connected modules. This ensures the highest reliability and yield rate.

1.1.1 Package Contents

The QL9600 box package contents include:

- QL9600 base unit
- Power cable
- RS-232C serial port cable (9 pin)
- USB cable
- Software CD

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Chapter 2
Hardware Overview

2.1 QL9600 Module

Figure 2-1 shows an overview of the T9600/QL9600 connected to an EPD and Adaptor/Socket Board to support programming of QuickLogic devices.

Figure 2-1: QL9600 Module

2.2 Adaptor/Socket Boards

To program QuickLogic devices, the T9600/QL9600 requires an adaptor/socket board. **Figure 2-2** displays the some of the different types of adaptor/socket boards that are available. For a full listing of the adaptors that are available for programming QuickLogic devices see http://www.quicklogic.com/home.asp?PageID=379&sMenuID=213 on the QuickLogic website.

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Figure 2-2: Adaptor/Socket Boards

The socket boards on the QL9600 are universal socket boards in the sense that one specific socket will serve most of the devices that can fit in that socket. When in operation, the QL9600 checks for the correct type of socket board in the selected device and displays a warning message if it is not correct.

2.3 The Extended Pin Driver (EPD) Module

To program QuickLogic devices, the T9600/QL9600 requires an EPD module. The EPD module is an optional unit for the T9600 that increases the number of pin drivers for enhancing the programming and testing capacity of the T9600.

2.4 Universal Serial Bus (USB) Connection Overview

2.4.1 USB Connection Topology

In addition to the traditional RS232 Serial port interface, QL9600 is designed with a USB interface to facilitate the high speed transferring of the data between the computer and programming module as well as between programming modules. USB interface is available for Windows 98 and 2000 operating systems only.

Figure 2-3 illustrates the topology of USB connections. To correctly connect the QL9600 modules by USB interface, follow the fundamentals of USB bus topology shown in **Figure 2-3**. The USB connects USB devices with the USB host. The USB physical interconnect is a tiered star topology. A hub is at the center of each star. Each wire segment is a point-to-point connection between the host and a hub or node, or a hub connected to another hub.

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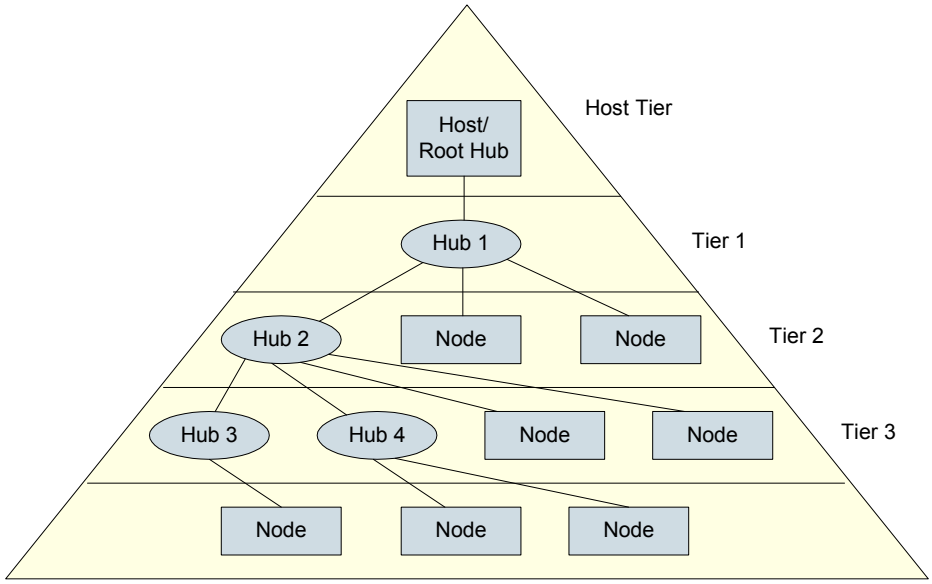
Figure 2-3: USB Connection Topology



2.4.2 USB Host

There is only one host in any USB system. The USB interface to the host computer system is referred to as the Host Controller. Use a host computer with a USB interface (Host Controller) to connect to the QL9600 programming modules. A Root Hub is already integrated within the computer system to provide one or more attachment points.

2.4.3 USB Device/Hub

A USB device is a unit that provides capabilities to the system. QL9600 provides programming functions to the system so it is a USB device (a Node in **Figure 2-3**). If a USB device provides additional attachment points to other USB interfaces, it is called a Hub. Each QL9600 is not only an USB device but also an USB hub which provides four additional attachment points to other QL9600 modules.

2.4.4 Upstream and Downstream

On each USB device, the USB port used for connecting to devices in the upper tier (see **Figure 2-4**) is called an upstream port. The USB port used for connecting to USB devices in the lower tiers are called downstream ports. For example, the QL9600 back panel has one upstream port and four downstream ports (as shown in **Figure 2-5**). Upstream and downstream ports take different connector types.

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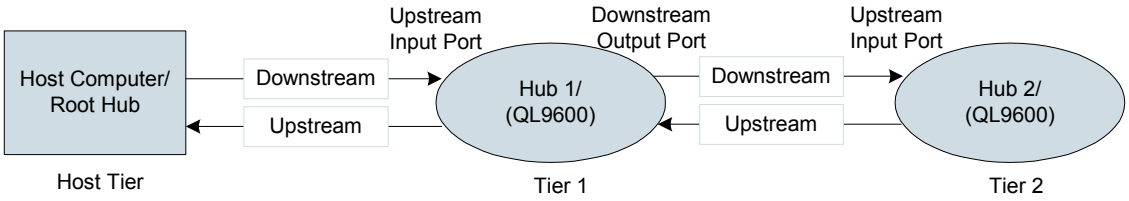
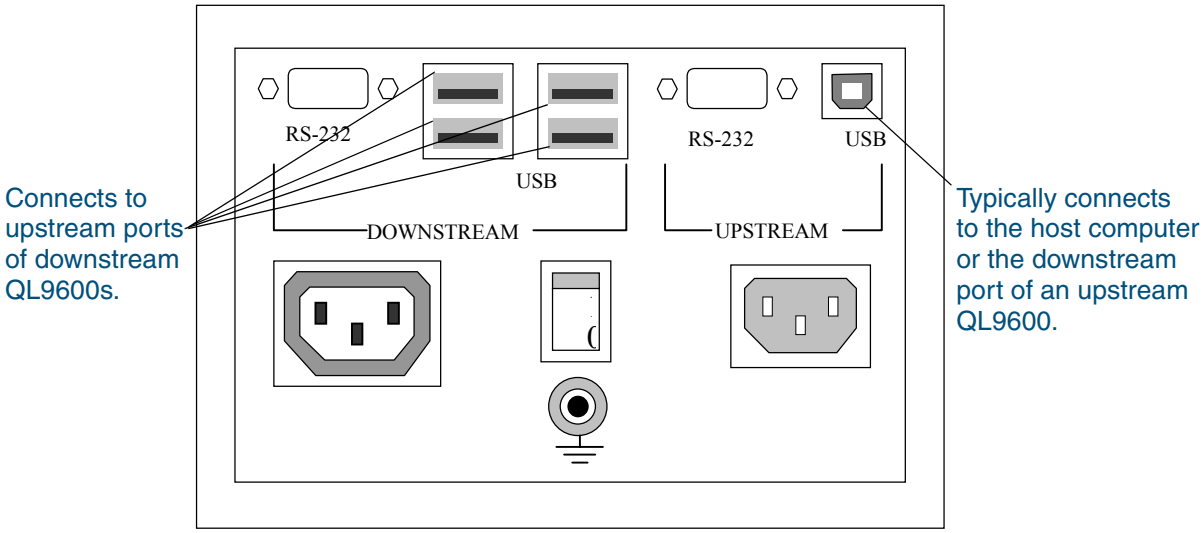
Figure 2-4: Upstream and Downstream Ports



NOTE: On the back panel of QL9600 module and also on the USB interface, the upstream and downstream connectors are different. Therefore, the two connectors on each end of the USB cable are different also. Be careful to match the physical appearance of each when providing connection.

Figure 2-5: QL9600 Back Panel



Through the USB connection topology explained previously, it is possible to build a large QL9600 gang programming system as shown **Figure 2-6**.

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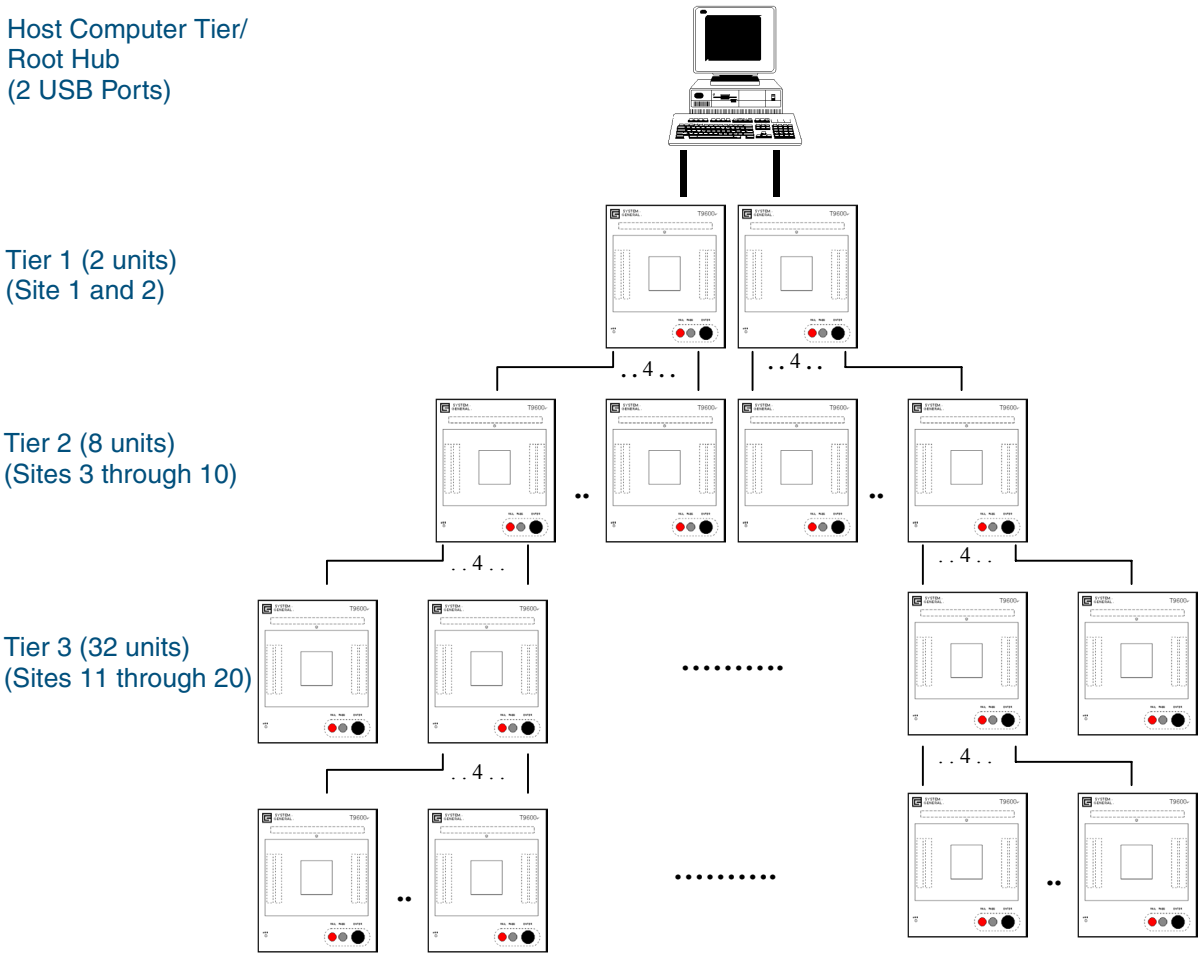
Figure 2-6: QL9600 Gang Programming System



2.4.5 Site ID

When building the QL9600 programming system (by serial port or USB connection), each QL9600 module will be assigned a Site ID (such as Site 1) to uniquely identify itself to the host computer. When running the QL9600 software, the programmer will be asked to assign one Site ID to each module connected. The programmer will be presented with a list of serial numbers for all of the QL9600 modules connected. The sequence of assigning each module an ID number is arbitrary, and the software will automatically make sure that Site IDs are continuous. Site ID must be re-assigned when changing the connection topology of QL9600 modules.

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Chapter 3
Hardware Installation

3.1 System Requirements

To connect QL9600 to a computer, the system requirements are:

- Pentium II (or higher)
- Microsoft Windows 95/98/NT/2000 for serial port
- Microsoft Windows 98/2000 for USB port
- Minimum of 64 MB RAM
- Minimum of 20 MB free disk space

3.2 Installing the Hardware

To install the hardware:

1. Connect the host computer and all QL9600 modules in the RS232 serial port or USB port interface.

   Depending on the computer configuration and operation system, use a serial port or USB interface to make connections between the computer and all QL9600 modules.

   – Serial port connection (Windows 95/98/NT/2000): Connect the computer and QL9600 modules using the RS232 serial interface cable that comes with each QL9600 shipment.

   – USB port connection (Windows 98/2000): Using the USB cable shipped with each QL9600 package, plug the appropriate connector into the computer USB port. Plug the other end of the USB cable into the USB port (labeled upstream) on the back panel of the first QL9600 module. If there is more than one QL9600 module, connect the additional QL9600 modules using the other USB cables. Connect them in a USB hierarchy using the least number of tiers possible. The USB cable must be connected to one of the four downstream USB ports on the back panel of the first module and the upstream USB port on each additional QL9600 module, using the first module as a hub to reduce the depth of the hierarchy.

2. Connect the power cords between the computer and all the QL9600 modules.

   Using the power cords in the QL9600 packages, following the previous procedure, make connections between the computer and all QL9600 modules in which serial port connection or USB connection has been made.

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3. Make sure that there are no devices in the sockets, and execute the power-on sequence.

   Turn on the power to the host computer, followed by turning on the power to each QL9600 module connected.

NOTE: Be sure that the power is turned on to every connected QL9600, otherwise the system may not behave normally. If a module that is connected in the serial or USB interface is not in use, disconnect the serial or USB port connection and turn off power to that module.

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Chapter 4
Software Installation

4.1 Software Contents

The QL9600 software CD contains:

- QL9600 software
- QL9600 Universal Programmer User Manual

4.2 Installing the Software

To install the software:

1. Insert the QL9600 software CD in the computer CD-ROM.
2. Double-click the CD-ROM icon to show the contents of the CD.
3. Double-click on the **`setup.exe`** icon to initiate the software installation process.
4. Follow the step-by-step instructions in the installation Wizard to complete the installation.
5. Restart the computer.
6. Select **Start | Programs | QL9600** to launch the application program.

NOTE: After installing the software and selecting the communication interface to connect the QL9600, the option is provided to perform a hardware self-test and DRAM test on the QL9600. The self-test of the QL9600 hardware takes about 50 seconds to conduct testing on each pin driver circuitry.

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Chapter 5
Quick Start

After performing the procedures outlined in **Chapter 3 "Hardware Installation" on page 9** and **Chapter 4 "Software Installation" on page 11**, it is time to begin programming a QuickLogic device. If you already know what type of socket board you will need for a particular device you want to program, you may install the socket boards on the modules now or you can do it later after you find out what socket board you need.

5.1 Programming a Device Using a USB Connection

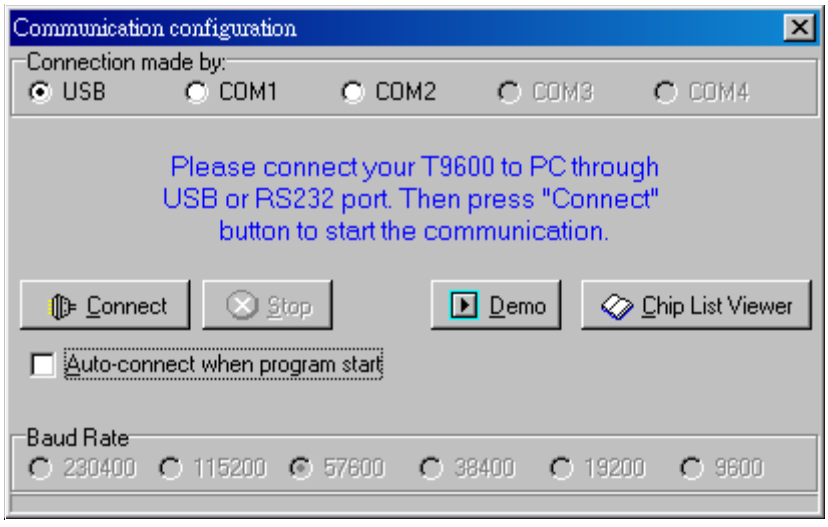
NOTE: If using the USB interface to connect the QL9600 modules, use Windows 98 or Windows 2000 which supports USB interface. To verify that the USB driver is properly installed in the computer select **Start | Settings | Control Panel**, double-click on the **System** icon, select the **Hardware** tab, click the **Device Manager** tab or button, expand the **Universal Serial Bus** listing. **Host Controller** and **Root Hub** should be listed under the **Universal Serial Bus** listing.

5.1.1 Launching the QL9600 User Interface Software

To launch the QL9600 software:

1. Select **Start | Programs | QL9600 | QL9600**, or double-click the QL9600 icon on the desktop to launch the application program.

   The Communication Configuration screen is dispalyed.



NOTE: Demo and **Chip List Viewer** buttons can be activated as standalone utilities on the computer without QL9600 being physically connected. They are the perfect tools for practicing with the software and understand how the software works. Use **Chip List Viewer** for finding out if a particular device is supported on the QL9600 and, if supported, what type of socket board is needed to program that particular device.

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5.1.2 Setting Up Communication with the Computer

To begin communication between the computer and the QL9600 modules:

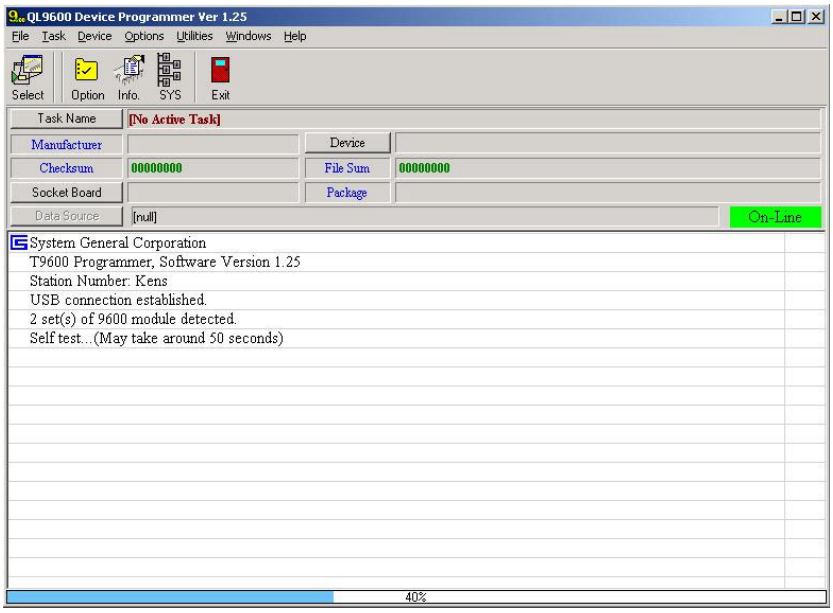
1. Click the USB radio button connection.

   If choosing a serial port connection, specify the baud rate the computer supports. The default baud rate is 57600 bits per second. QL9600 can support up to 230400 bits per second.)

2. Click **Connect** to establish connection between the QL9600 modules and computer.
3. The QL9600 will show a prompt to confirm the number of connected programmers.
   - If the number of programmers is incorrect, select **No** and power-off the programmers. Check all of the cables and retry.
   - If the number of programmers is correct, select **Yes** to confirm the number of programmers found.

   A message is displayed on the screen to remove all the devices from the socket board.
4. Click **OK**.

   The QL9600 Device Programmer screen is displayed while the system goes into self-test mode.


QL9600 Device Programmer Ver 1.25
File Task Device Options Utilities Windows Help
Select Option Info. SYS Exit
Task Name [No Active Task]
Manufacturer Device
Checksum 00000000 File Sum 00000000
Socket Board Package
Data Source [null] On-Line
System General Corporation
T9600 Programmer, Software Version 1.25
Station Number: Kens
USB connection established.
2 set(s) of 9600 module detected.
Self test...(May take around 50 seconds)
40%

If this is a first-time connection between the computer and QL9600 modules, a message is displayed stating that the Site ID number(s) of the module(s) are not assigned properly.

5. Click **OK**.

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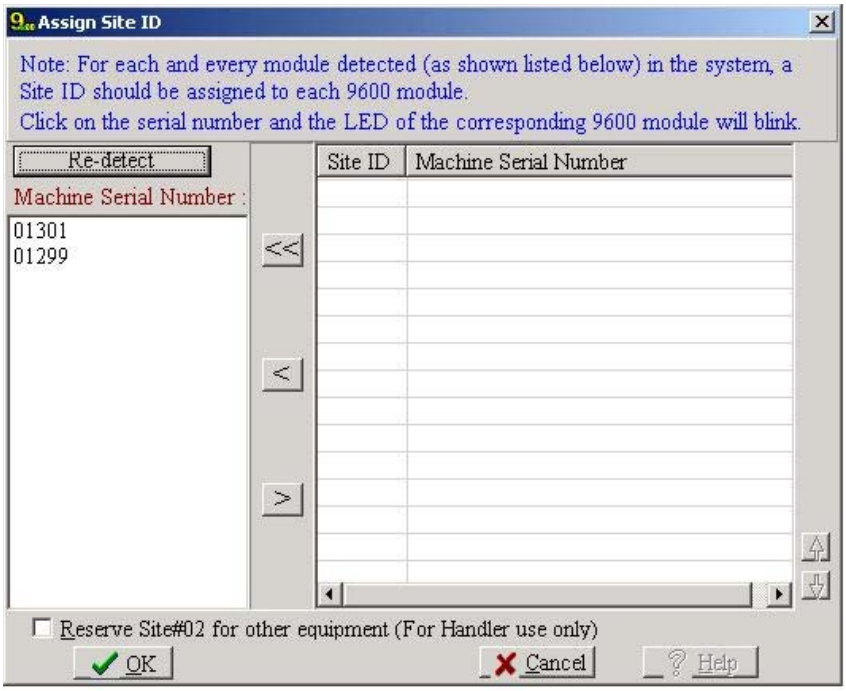
The Assign Site ID screen is displayed.


Assign Site ID
Note: For each and every module detected (as shown listed below) in the system, a Site ID should be assigned to each 9600 module.
Click on the serial number and the LED of the corresponding 9600 module will blink.
Re-detect
Machine Serial Number :
01301
01299
<<
<
>
Site ID
Machine Serial Number
Reserve Site#02 for other equipment (For Handler use only)
OK
Cancel
Help

5.1.3 Assigning a Site ID to Each Connected QL9600 Module

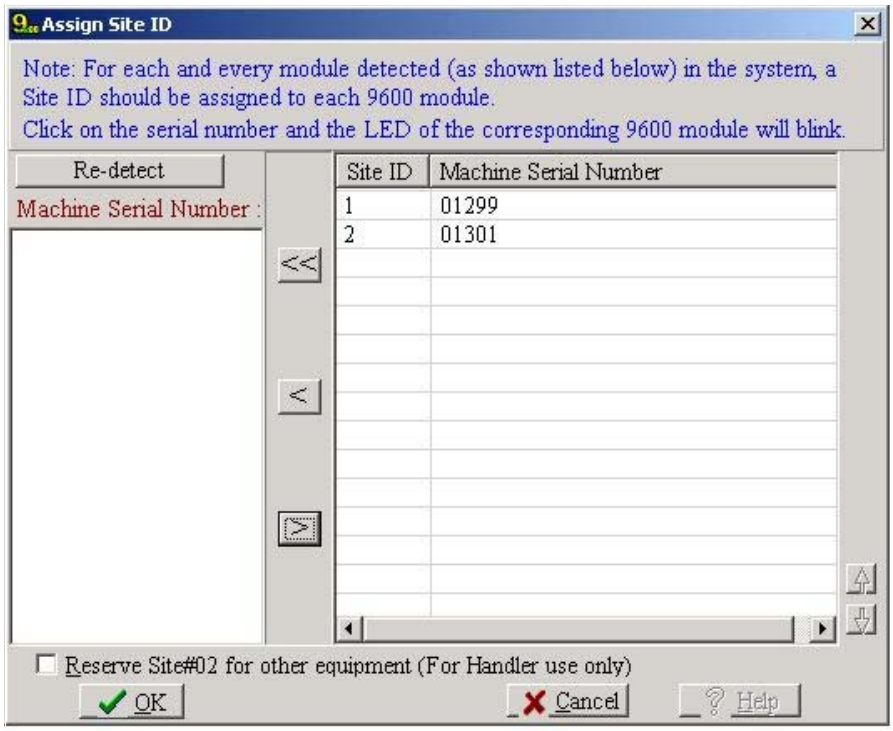
On the left side of the screen the serial numbers of all the connected QL9600 modules are displayed. This screen is used to assign Site IDs to QL9600 modules. To renumber Site IDs at any time, from the QL9600 Device Programmer main menu bar select **Options | System Option** and click **Assign Site ID**.

To assign the Site IDs of the modules:

1. Select the serial number to see the corresponding QL9600 module.

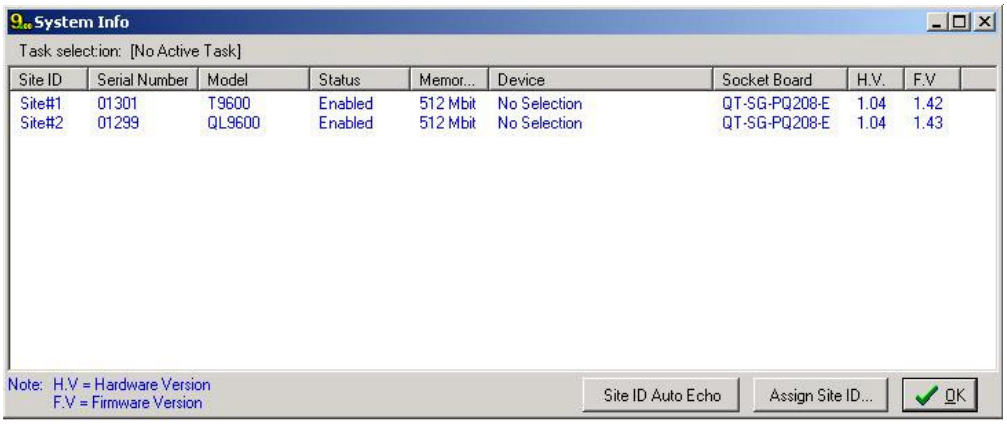
   The corresponding QL9600 module will flash its LED on the top panel to identify itself.

2. Click on the > button to add this module to the right side in which the smallest available Site ID number (beginning with Site ID 1) will be assigned to it. Continue this operation until all the serial numbers on the left are assigned.


Assign Site ID
Note: For each and every module detected (as shown listed below) in the system, a Site ID should be assigned to each 9600 module.
Click on the serial number and the LED of the corresponding 9600 module will blink.
Re-detect
Machine Serial Number :
Site ID
Machine Serial Number
1
01299
2
01301
<<
<
>
Reserve Site#02 for other equipment (For Handler use only)
OK
Cancel
Help

For ease of use, assign Site ID 1 to the QL9600 module closest to the computer, followed by the rest of the modules in a sequence based on their distances to the computer. Use a Site ID assignment that is intuitive for identification of each module during operations. Once the site IDs have been assigned, it is not necessary to re-assign the IDs again unless programmers are added or removed from the setup.

The System Info screen is displayed. To view system configuration information at any time, click on the **SYS** icon on the QL9600 Device Programmer main menu tool bar.



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In this example, there is one QL9600 module and one T9600 module, each mounted with a QT-SG-PQ208 socket board. If a socket board is hot-swapped with another type, the System Info screen will detect and report the change. As in the Assign Site ID screen, select one of the rows and the corresponding QL9600 module will echo by blinking its LED on the top panel.

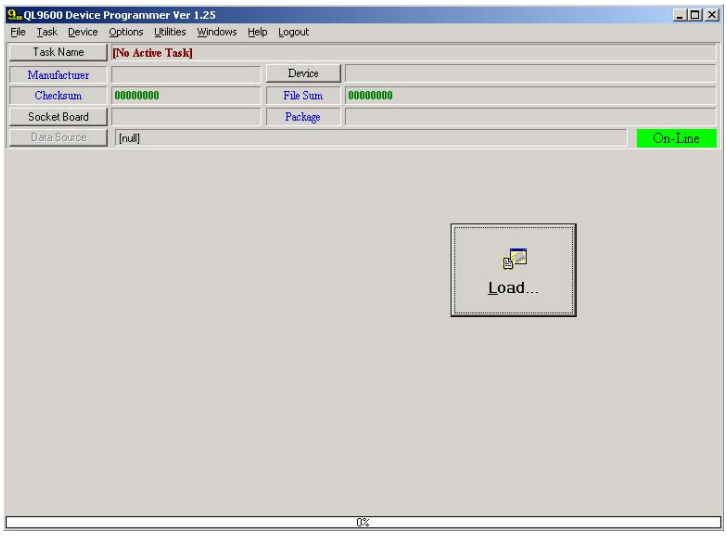
5.1.4 Downloading the Data into QL9600 Modules

The QL9600 module requires two things to program a QuickLogic device:

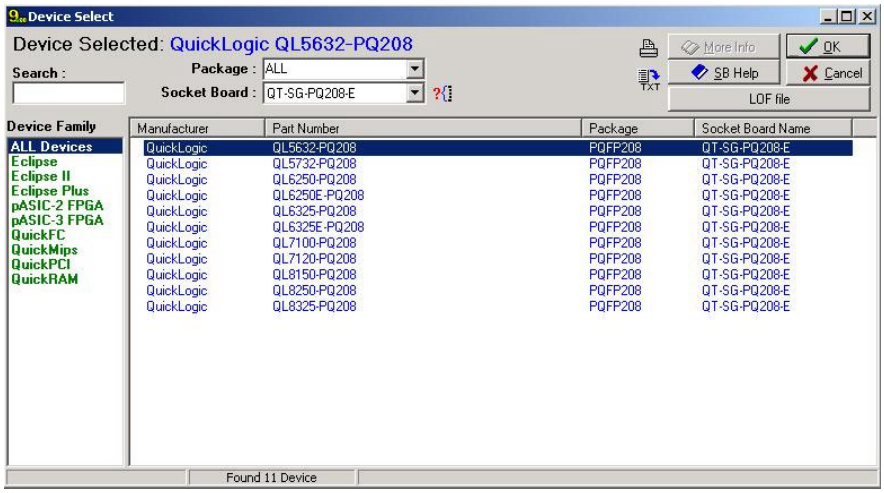
- A device driver that is used to program the device.
- A LOF file that contains a set of design links that are to be programmed.

There are several ways to download the data into the QL9600 modules, but for the purpose of this quick start guide, only one way will be described.

1. Click **Load** on the QL9600 Device Programmer main screen.



The Device Select screen is displayed.



This screen enables the programmer to select the LOF file and the device driver. The screen will default to a listing all of the devices that can be programmed with the adaptor that is currently inserted in the programmer.

In Device Select screen the programmer can search for the device to program and the required socket board to install.

- Narrow the search by selecting the device package type in the **Socket Board** drop down menu, or alternatively by selecting the device family on the left side of the screen.
- To find out what devices can be programmed by the currently installed socket boards, click on the small icon just to the right of the **Socket Board** drop down menu.

2. Click **LOF File** to select a LOF to be downloaded.

   Once the LOF file has been selected, the correct driver for that LOF file will be highlighted.

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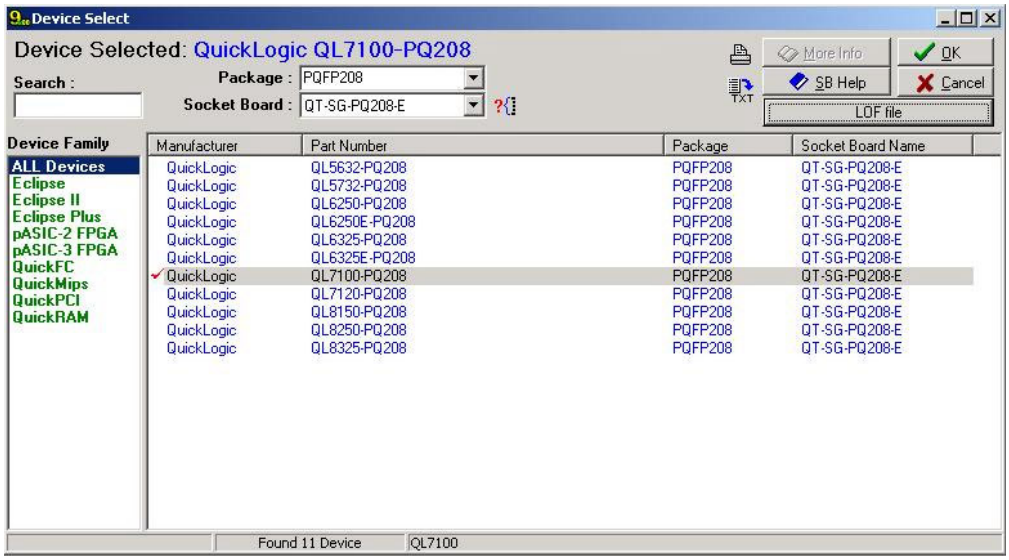
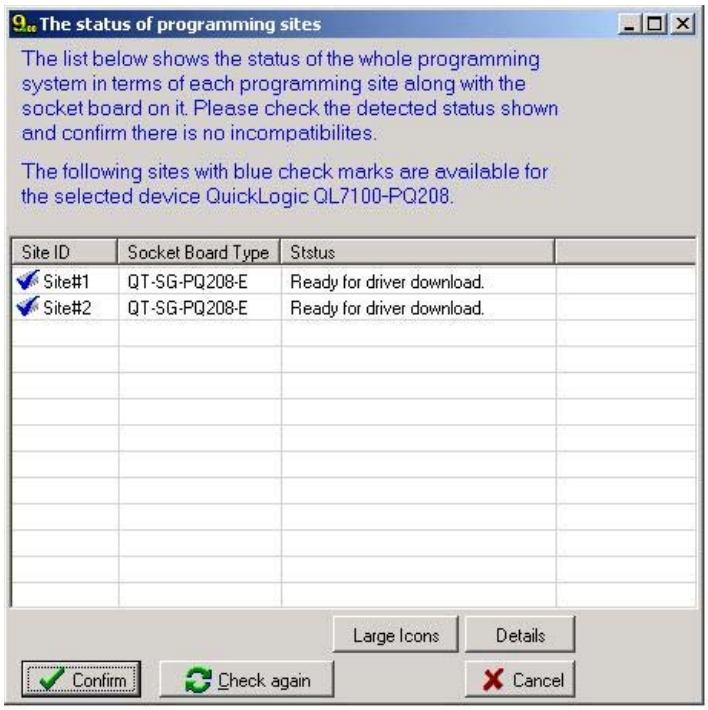
3. Click **OK** to confirm the driver and LOF file download.

   The selected LOF file and highlighted driver will be downloaded at the same time.



The status of programming sites screen is displayed. Confirm the hardware settings and verify that the board has been installed properly.


The status of programming sites
The list below shows the status of the whole programming system in terms of each programming site along with the socket board on it. Please check the detected status shown and confirm there is no incompatibilites.
The following sites with blue check marks are available for the selected device QuickLogic QL7100-PQ208.
Site ID
Socket Board Type
Ststus
Site#1 QT-SG-PQ208-E Ready for driver download.
Site#2 QT-SG-PQ208-E Ready for driver download.
Large Icons
Details
Confirm
Check again
Cancel

4. If the correct socket boards are not already installed, install the correct socket boards on the QL9600 modules.
5. Click **Check again** to recheck the hardware configuration.

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6. If everything is correct, click **Confirm**.

   A message is displayed on the screen to remove all the devices from the socket board.

7. Click **OK**.

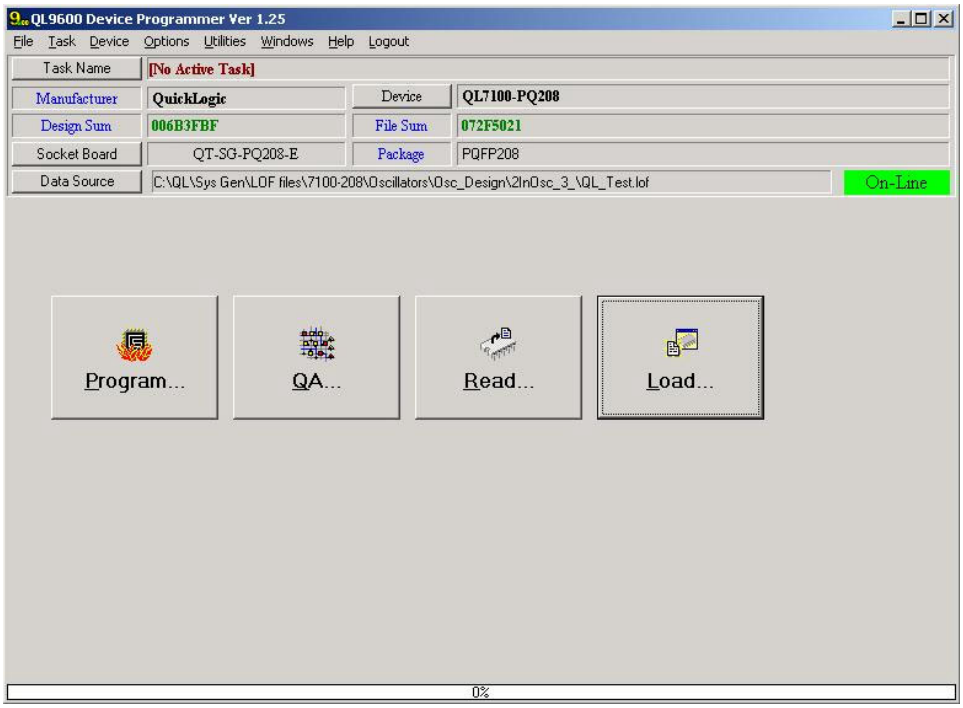
   Before the data is downloaded to the programmer it will do a self-test and then prompt the programmer to enter the foundry lot and job numbers.

8. Type the foundry lot and job numbers (optional).

   These numbers will be displayed on the programming summary files.

9. Click **OK** to each to continue with the download.

   Once the LOF file has been downloaded successfully, the QL9600 Device Programmer screen is displayed.



From this screen the user can program units, QA, read the silicon signature, or load an alternative LOF file.

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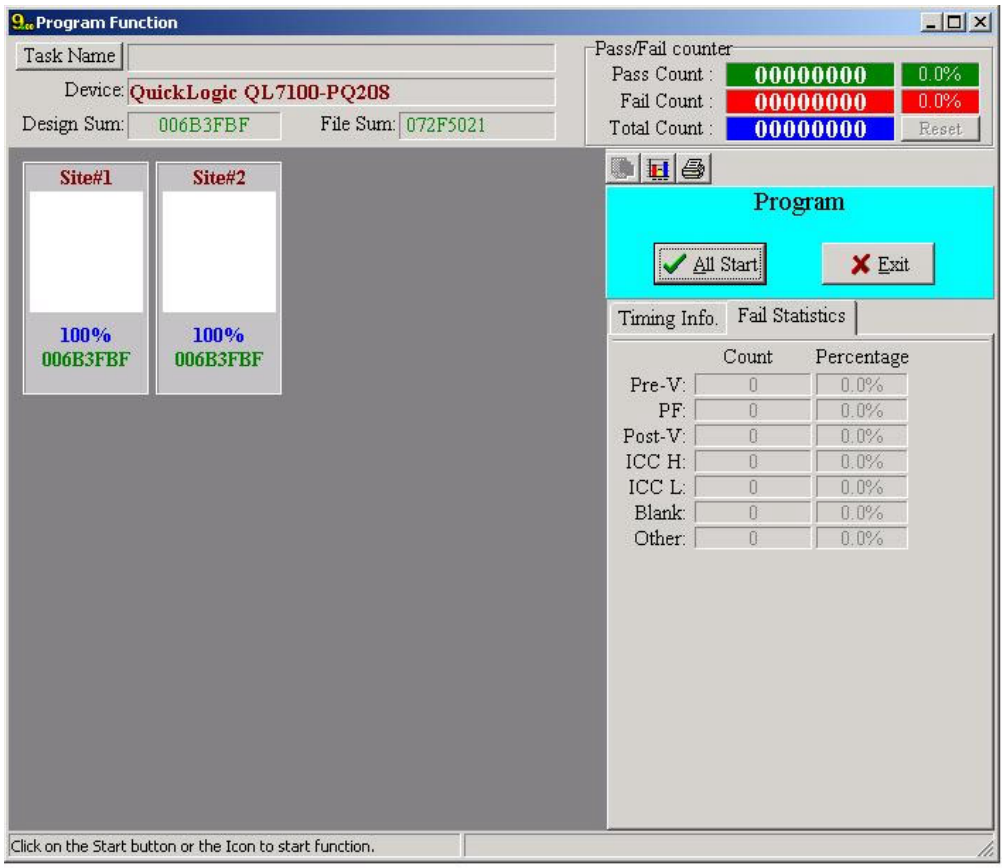
5.1.5 Programming Devices

To program the devices:

1. Click on **Program**.

   The Program Function screen is displayed.



2. Click on **Task Name** to review details about the active task.
3. Click **Close**.
4. Conduct the programming operation in a **Synchronous** or **Asynchronous** mode. Click on **All Start** to synchronously start programming operation on all of the QL9600 modules, or click on an individual QL9600 module icon to activate the programming operation in that site.

5.1.6 QA/Testing the Device

The QA screen looks similar to the Programming Function screen. Use this screen to perform a similar test at the end of programming to ensure that the devices are good.

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5.1.7 Reading the Device

The Read Device screen looks similar to the Programming Function screen. Use this screen to read the silicon signature of the devices. The silicon signature will display the following details of the device:

- Design Checksum
- File Checksum
- Programmer Vendor (indicates the type of programmer used to program the parts)
- Software Revision
- Date Programmed
- Status

NOTE: In gang mode, once the silicon signature has been read, moving the mouse over a programmer or clicking on the appropriate site tab will display the details for the device in that programmer.

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Appendix A
Technical Support and FAQs

A.1 Technical Support

There are many options for technical support when installing and using the QL9600. These consist of the internet web site, e-mail, and telephone support. A brief breakdown of the resources and how to access them is listed below.

A.1.1 Internet Web Site

QuickLogic Software and Devices: www.quicklogic.com/support

You can access http://www.quicklogic.com/software download to download the latest version of QL9600 software. QL9600 software contains a demo mode, which can run independently for practice or evaluation purposes.

A.1.2 e-mail

QuickLogic Software and Devices: support@quicklogic.com

A.1.3 Telephone

USA - Technical Hotline: (408) 990-4100

Europe - Hotline: +44-1932-57-9011

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A.2 Frequently Asked Questions (FAQs)

The following is a list of Frequently Asked Questions for the QL9600 module.

Question: What versions of Windows are supported?

Answer: For serial port interface, Microsoft Windows 95, 98, NT, and 2000. For USB port interface, Microsoft Windows 98 and 2000.

Question: What is a Site ID?

Answer: A Site ID is an identification code that is used to refer to or identify a particular QL9600 module in a multi-linking configuration. Similar to assigning a name to each connected module. All the software log and messages refer to the QL9600 module by its uniquely assigned Site ID instead of its serial code. For ease of use, assign Site ID 1 to the QL9600 module closest to the computer, followed by the rest of the modules in a sequence based on their distances to the computer. Use a Site ID assignment that is intuitive for identification of each module during operations.

Question: How do I deal with devices in other packages?

Answer: Use socket boards. A socket board is essentially an adapter to connect QL9600 pin driver signals to the device under programming.

Question: How do I know if a particular device I need to program is supported or not?

Answer: QL9600 software is equipped with a demo mode which allows it to run in standalone mode. You can try it out and also learn what socket board you will need to program a particular device.

Question: Should I connect the QL9600 to the computer in USB or serial interface?

Answer: QuickLogic recommends the use of the USB due to higher performance download speeds. However, without regard to download speeds, it does not matter whether you choose the USB or serial port to connect the programmer to your computer.

Question: What are Tasks?

Answer: Tasks enable a user to marry a device driver and LOF file together. Once created the user can simply download a task rather than having to select both the device driver and the LOF file to be downloaded. To create a task, select **Task | Create Task** from the main screen.

Question: Where can I get the new software updates?

Answer: QuickLogic's download page at www.quicklogic.com/software_download.The demo software is the best source to view the chip list.

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Question: Why does it take so long to download the LOF file when I am using USB?

Answer: USB can handle transfer speeds of up to 12 Megabits per second. However, the bottleneck is in the downloading of the LOF file due to the QL9600 interpreting the LOF data and writing it to memory, giving an overall transfer rate of 0.2 Megabits per second. For example, a 10 MB LOF file should download in less than 7 minutes to a single QL9600.

Question: Why does my computer take excessively long to download a LOF file?

Answer: USB competes for the use of the CPU; if you are running another application that is processor intensive, the download rate will be adversely affected. To ensure shortest download times, any processor intensive applications should be closed before starting the QL9600. Note that closing the offending application during the download will not enable the QL9600 transfer rate to speed up as it remains at the same rate. For best results use a dedicated machine for programming.

Question: Who do I contact if I think if have low yielding or bad hardware?

Answer: Contact QuickLogic's Application Support at http://www.quicklogic.com/support or 408-990-4100.

Question: How do I do a Return Material Authorization (RMA)?

Answer: Contact QuickLogic's Application Support at http://www.quicklogic.com/support or (408) 990-4100 and speak to them about the problems you are seeing. If it is obviously the hardware failing, go to System General's web site at http://www.systemgeneral.com/ or http://www.sg.com.tw/ and file a RMA.

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